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Published to advance the Science of cold-blooded vertebrates

DESTRUCTION OF LOG PERCH EGGS BY SUCKERS.

While collecting eggs of the log perch, *Percina caprodes*, (Rafinesque), at Douglas Lake, Michigan, during the second week of July, schools of suckers, *Catostomus commersonii* (Lacepede), were observed raiding the spawning grounds of the log perch. These suckers quietly entered the schools of log perch which were spawning in the shallow water near shore, and crowded the spawning fish aside to eat their recently laid eggs. The suckers were shy and retired to deep water when disturbed, returning again to the spawning grounds as soon as opportunity offered. They were seen in and near the schools of log perch throughout the day, for nearly two weeks.

Twenty of these suckers were captured about 9:30 A. M., while feeding among the log perch. Five were killed at once. The remaining 15 were placed in a live-car some distance from the spawning grounds and killed at intervals during the next 24 hours. The entire alimentary canal of each suckers was examined immediately after each fish was killed, and the number of log perch eggs noted. The data are tabulated below:

No.	Body length	Sex	Time in live-car	Eggs in ali. canal	Sand in ali. canal
	mm.				cc.
1	290	male	0	452	11.00
2	300	"	0	1,243	9.00
3	290	"	0	607	8.50
4	285	"	0	475	6.00
5	305	female	0	745	9.50
6	305	"	1 hr. 30 min.	704	4.50
7	265	male	1 hr. 45 min.	1,475	7.00
8	280	"	2 hrs.	246	3.00
9	290	"	3 hrs. 45 min.	649	8.00
10	280	"	3 hrs. 45 min.	222	5.00
11	270	"	4 hrs.	389	2.00
12	280	female	4 hrs.	23	2.50
13	310	male	4 hrs. 30 min.	64	0.75
14	315	"	5 hrs.	333	6.00
15	230	"	5 hrs.	390	2.00

Temperature of water in live-car 19° C.

From the table it may be seen that the average number of eggs in each alimentary canal was 500, and that two individuals each contained over 1,200 eggs. These figures do not include the partially digested and crushed eggs, as only whole eggs and recently-ruptured eggs were counted. The intestinal contents of all of the 15 suckers examined, however, included oily masses of partially digested eggs. This average of 500 eggs per sucker is also probably lowered through the loss of eggs crushed or digested while the fish were in the live-car, as but one-third of the 15 averaged were killed immediately after their capture on the spawning grounds. Aside from the eggs of *Percina caprodes*, the alimentary canals of these suckers contained little or no organic material, but fine sand was always mixed with the eggs. This fine sand undoubtedly was swallowed with the eggs, a portion of it at least attached to them, as the eggs of the log perch are covered with a coat of sand and debris shortly after leaving the body of the female. The average volume of sand in each alimentary canal was about five times the average volume of unbroken eggs present, as one cubic centimeter of log perch eggs contains about 440 eggs.

The remaining five suckers were killed after 24 hours of isolation in the live-car. No whole eggs were found in the alimentary canals of these fish, and only small masses of oil and sand were present in the posterior portions of the intestines. The absence of eggs in the alimentary canals of these five fish, collected while feeding with the other 15, considered with the fact that the alimentary canals of the other 15 contained an average of 500 eggs each, suggests the possible consumption of at least 500 log perch eggs every 24 hours by each sucker following the schools of log perch. The actual destruction of eggs by each sucker is probably greater, however, as the broken eggs remain uncounted. The percentage of the total number of eggs produced by the female log perch of these schools, destroyed by the suckers was not ascertained. Several female log perch taken at random yielded about 100 mature eggs each, although the ovaries of these fish contained large numbers of immature eggs.

While considering the destruction of the log perch eggs by suckers it may be noted that the log perch themselves crowd about spawning individuals of their own species and devour the recently-laid eggs. Ten male log perch collected with the suckers were examined and from eight to 20 eggs were found in the stomach of each one.

M. M. ELLIS,
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NOTES ON THE BREEDING AND INCUBATION PERIODS OF THE IOWA, DARTER, *ETHEOSTOMA IOWAE* JORDAN AND MEEK.

While collecting embryological material during the spring of 1917 the eggs of the Iowa Darter, *Etheostoma iowae*, were obtained, fertilized and carried through the hatching period.